

### **REMARKS**

Applicant has carefully reviewed and considered the Office Action mailed on July 22, 2003, and the references cited therewith.

Claims 1-4, 10-17, and 29 are pending in this application.

#### **Information Disclosure Statement**

Applicant respectfully requests that a copy of the 1449 Form, listing all references that were submitted with the Supplemental Information Disclosure Statement filed on July 24, 2003, marked as being considered and initialed by the Examiner, be returned with the next official communication.

#### **Rebuttal to Examiner's Responses**

Applicant notes that the rejections of claims are a *verbatim* repetition of the Office Action that was mailed on January 10, 2003. Applicant further notes the most recent Office Action, the Office Action that was mailed on July 22, 2003 (hereinafter, "Office Action") includes selected Response(s) to Arguments, beginning on page 8. Applicant believes that the allowance of the pending claims can be expedited by addressing the selected responses first.

At page 8 of the Office Action, the Examiner appears to be addressing the rejection of claim 1. The Office Action again admits that "Chen et al. fail to disclose the patterned adhesive layer 33." Applicant argued the impropriety of combining Chen with Jimarez, but the Office Action is silent regarding this impropriety, rather, it merely repeated that it "combines the references of Chen et al. to Jimarez et al. because Jimarez et al. disclose a patterned thermally conductive adhesive layer" etc. (Office Action at pages 8 and 9). The Office has therefore failed to rebut Applicant's assertion of the impropriety of combining Chen with Jimarez. Withdrawal of the rejections with respect to Chen in view of Jimarez is respectfully requested.

At page 9, the Office Action, apparently still addressing claim 1, disagrees that "Jimarez et al. fail to teach an encapsulation material that is disposed both on the die active surface and the heat sink . . . ." But this is unmistakable in Jimarez. The Office Action next creates a straw man argument that the "second reference does not need to disclose all the limitations of the claimed

invention." (Office Action at page 9). Applicant never did, and does not now dispute this assertion since it is immaterial to the issue of patentability. Rather, Applicant disputes the propriety of combining references. In response thereto, the Office Action merely states a conclusion of law regarding the "test for obviousness" (Office Action at page 9), without addressing Applicant's traversal in any way. Such a conclusory statement fails to meet the Office's burden of proof and rebuttal to the Applicant's traversal. Withdrawal of the rejections is therefore respectfully requested.

At page 9, the Office appears to be addressing the rejection of claims 1-4 (Office Action at page 3) over Eichelberger in view of Jimarez. The Office Action disputes the Applicant's assertion that "Eichelberger's encapsulant 18 is not disposed on the substrate 12, rather, it is disposed on the die attach material 16." (Office Action at page 9). The assertion that the "encapsulant 18 is disposed on the heat sink 12 through the die attach material 16" (Office Action at page 10) is a resort to semantic gymnastics that is disingenuous. The die attach material 16 is the only structure in Jimarez that is disposed on the substrate 12. The plain meaning of what is claimed in claim 1 can be ascertained by reading Applicant's disclosure, including the figures. Because Eichelberger in view of Jimarez does not teach the limitation of claim 1, "an encapsulation material disposed on said heat sink and said microelectronic die active surface" (claim 1), withdrawal of the rejections is therefore respectfully requested.

At page 10, the Office appears to be addressing the rejection of claims 10, 15, and 16 over Shen in view of Woodward. For most of page 10, the Office recites statements of law, which are conclusory as they do not address the applicant's traversals. The Office Action has therefore failed to meet its burden of rebuttal of Applicant's traversals. Finally, at page 11, the Office Action repeats, *verbatim*, the statement of rejection that appears at page 6 (which is the second *verbatim* repetition of the rejection that appeared at page 6 of the Office Action mailed on January 10, 2003). This repetition fails to meet the Office's burden of coming forward with evidence to rebut Applicant's traversal of these rejections. Further, the Office Action fails to meet its burden of rebuttal of Applicant's traversal of these rejections. Withdrawal of the rejections is therefore respectfully requested.

Applicant notes the Office Action fails to address Applicant's traversal of the following *verbatim* repetition of rejections:

The *verbatim* repetition of rejection of claim 29 over Chen in view of Jimarez and further in view of Woodward. Because there is no rebuttal to Applicant's traversal of these rejections, proffered in the Amendment filed May 21, 2003, the Office has failed to meet its burden of going forward as well as its burden of rebuttal. Withdrawal of the rejection is respectfully requested.

The *verbatim* repetition of rejection of claim 29 over Eichelberger in view of Jimarez and further in view of Woodward. Because there is no rebuttal to Applicant's traversal of these rejections, proffered in the Amendment filed May 21, 2003, the Office has failed to meet its burden of going forward as well as its burden of rebuttal. Withdrawal of the rejection is respectfully requested.

The *verbatim* repetition of rejection of claims 11-14 over Shen in view of Woodward and further in view of Eichelberger. Because there is no rebuttal to Applicant's traversal of these rejections, proffered in the Amendment filed May 21, 2003, the Office has failed to meet its burden of going forward as well as its burden of rebuttal. Withdrawal of the rejections is respectfully requested.

The *verbatim* repetition of rejection of claim 17 over Shen in view of Woodward and further in view of Jimarez. Because there is no rebuttal to Applicant's traversal of this rejection, proffered in the Amendment filed May 21, 2003, the Office has failed to meet its burden of going forward as well as its burden of rebuttal. Withdrawal of the rejection is respectfully requested.

Applicant now repeats its traversal of the various rejections, appertaining to the Office Action. Applicant, however, considers the claims are allowed over the cited references as set forth above, and as set forth in Applicant's Amendment filed May 21, 2003.

#### §103 Rejection of the Claims

Claim 1 was rejected under 35 USC § 103(a) as being unpatentable over Chen et al. (U.S. 6,160,311) in view of Jimarez et al. (U.S. 6,407,334). Claim 1 was rejected under 35 USC §

103(a) as being unpatentable over Chen et al. (U.S. Patent No. 6,160,311) in view of Jimarez et al. (U.S. Patent No. 6,407,334). The Applicant respectfully traverses the rejection and requests the Office to consider the following.

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaack, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (M.P.E.P. § 2143 8<sup>th</sup> Ed. Rev. 1).

The Office Action admits that "Chen et al. fail to disclose the patterned adhesive layer 33 is a patterned thermally conductive adhesive." (Office Action at page 2).

Regarding the first criterion, there is no teaching or suggestion in either Chen or Jimarez to combine reference teachings. Chen relates to packaging a wire-bond chip 31 to a substrate 34, which acts as an interposer of sorts, to make electrical contact with a metal ball 37. Jimarez relates to assuring electrical grounding within a package by coupling a chip 34 to a large body of electrically conductive adhesive 40. There is no teaching or suggestion in Chen to look to Jimarez to find a patterned adhesive 44 in Jimarez. Jimarez also fails to teach an encapsulation material that is disposed both on the die active surface and the heat sink, as required in claim 1. The structure of Jimarez is significantly different from what is claimed, and its incidental occurrence of an adhesive 44 is neither taught or suggested in Chen. Withdrawal of the rejection is respectfully requested.

Regarding the second criterion, there is no expectation of success to achieve the enhanced heat dissipating of Chen, or the electrical grounding of Jimarez by their combination. This is because of their disparate endeavors in the technologies they teach. That Jimarez may have a patterned adhesive 44 can only be combined with the teachings of Chen by using the Applicant's disclosure as a guide. Withdrawal of the rejection is respectfully requested.

Regarding the third criterion, merely that the Office Action assembles a mosaic of elements to assert a rejection, does not mean all the claims limitations are taught within the standard of unobviousness. The standard of patentability requires "the subject matter as a whole" was not "obvious at the time the invention was made to a person of ordinary skill in the art . . . ." Jimarez also fails to teach an encapsulation material that is disposed on the die active surface and the heat sink, as required in claim 1. Applicant respectfully asserts that the combination of Chen with Jimarez cannot be made without using the Applicant's disclosure as a guide. Withdrawal of the rejection is respectfully requested.

Claim 29 was rejected under 35 USC § 103(a) as being unpatentable over Chen et al. (U.S. Patent No. 6,160,311) in view of Jimarez et al. (U.S. Patent No. 6,407,334) and further in view of Woodward et al. (U.S. Patent No. 4,731,700). The Applicant respectfully traverses the rejection and requests the Office to consider the following.

Applicant incorporates all the arguments above regarding the improper combination of Chen with Jimarez. The Office Action admits that "Chen et al. and Jimarez fail to disclose a microelectronic package core and wherein at least one die is disposed within at least one package core opening." (Office Action at page 3). Woodward provides a radically different technology than either of Chen or Jimarez.

Applicant notes that structurally between Woodward's chip 16 and his heat sink 12 is a layer of molybdenum 12c that is not taught as an adhesive of any type. Rather, item 12c is simply referred to as a part of the heat sink 12.

Regarding the first criterion, because Woodward is solving wire routing problems by disposing some wiring 24 across the chip 16, and because Chen and Jimarez have significantly different technical challenges from each other and from Woodward, the combination of Chen and Jimarez with Woodward can only be reached by using the Applicant's disclosure as a guide. Withdrawal of the rejection is respectfully requested.

Regarding the second criterion, there is no expectation of success to get a better pin-out for Chen by the application of Woodward, and there is no expectation of success to better ground

the die in Woodward by the application of Jimarez. Withdrawal of the rejection is respectfully requested.

Regarding the third criterion, merely that the Office Action assembles a mosaic of elements to assert a rejection, does not mean all the claims limitations are taught within the standard of unobviousness. The standard of patentability requires "the subject matter as a whole" was not "obvious at the time the invention was made to a person of ordinary skill in the art . . . ." Applicant respectfully asserts that the combination of Chen and Jimarez with Woodward, creates a teaching that starts to drop out claimed elements, including a patterned thermally conductive adhesive. Applicant therefore respectfully asserts this combination cannot be made without using the Applicant's disclosure as a guide. Withdrawal of the rejection is respectfully requested.

Claims 1-4 were rejected under 35 USC § 103(a) as being unpatentable over Eichelberger (U.S. Patent No. 5,250,843) in view of Jimarez et al. (U.S. Patent No. 6,407,334). The Applicant respectfully traverses the rejection and requests the Office to consider the following.

The Office Action admits "Eichelberger fails to disclose a thin die attach material 16 is a patterned thermally conductive adhesive layer." (Office Action at page 4). Applicant notes Eichelberger's thin die attach material 16 is not patterned. Applicant further notes Eichelberger's encapsulant 18 is not disposed on the substrate 12, rather, it is disposed on the die attach material 16. Therefore, Eichelberger's structure is not, nor cannot be construed to teach or suggest what is claimed. The Office Action looks to Jimarez to remedy what is missing in Eichelberger. But Jimarez also fails to teach an encapsulation material that is disposed on the die active surface and the heat sink, as required in claim 1.

Regarding claim 1 and the first criterion, there is no teaching or suggestion in either Eichelberger or Jimarez to combine reference teachings to achieve the limits of claim 1. Eichelberger fails to teach patterned adhesive layer and an encapsulant that is disposed on both the heat sink and the die active surface. Jimarez relates to assuring electrical grounding within a package by coupling a chip 34 to a large body of electrically conductive adhesive 40. There is not teaching or suggestion in Eichelberger to look to Jimarez to find a patterned adhesive 44 in Jimarez. Withdrawal of the rejection is respectfully requested.

Regarding claim 1 and the second criterion, there is no expectation of success to achieve the structure of Eichelberger, or the electrical grounding of Jimarez by their combination. This is because of their disparate endeavors in the technologies they teach. That Jimarez may have a patterned adhesive 44 can only be combined with the teachings of Eichelberger by using the Applicant's disclosure as a guide. Withdrawal of the rejection is respectfully requested.

Regarding claim 1 and the third criterion, merely that the Office Action assembles a mosaic of elements to assert a rejection, does not mean all the claims limitations are taught within the standard of unobviousness. The standard of patentability requires "the subject matter as a whole" was not "obvious at the time the invention was made to a person of ordinary skill in the art . . . ." Applicant respectfully asserts that the combination of Eichelberger with Jimarez cannot be made without using the Applicant's disclosure as a guide, and even if they could be combined properly, they do not teach all the claim elements as set forth above. Withdrawal of the rejection is respectfully requested.

Regarding claim 2, although Eichelberger may teach a build-up layer etc., because claim 2 depends from claim 1, all the claim limitations are not taught as set forth above. Withdrawal of the rejection is respectfully requested.

Regarding claim 3, although Eichelberger may teach a conductive trace etc., because claim 3 depends from claim 1, all the claim limitations are not taught as set forth above. Withdrawal of the rejection is respectfully requested.

Regarding claim 4, although Eichelberger may teach a second conductive trace etc., because claim 4 depends from claim 1, all the claim limitations are not taught as set forth above. Withdrawal of the rejection is respectfully requested.

Claim 29 was rejected under 35 USC § 103(a) as being unpatentable over Eichelberger (U.S. Patent No. 5,250,843) in view of Jimarez et al. (U.S. Patent No. 6,407,334) and further in view of Woodward et al. (U.S. Patent No. 4,731,700). The Applicant respectfully traverses the rejection and requests the Office to consider the following.

The Office Action admits "Eichelberger and Jimarez et al. fail to disclose a microelectronic package core and wherein at least one die is disposed within at least one package

core opening." (Office Action at page 5) Applicant notes Eichelberger's thin die attach material 16 is not patterned. Applicant further notes Eichelberger's encapsulant 18 is not disposed on the substrate 12, rather, it is disposed on the die attach material 16. Neither does Jimarez teach the limitation that the encapsulant is disposed on the heat sink and the die.

Applicant notes that structurally between Woodward's chip 16 and his heat sink 12 is a layer of molybdenum 12c that is not taught as an adhesive of any type. Rather, item 12c is simply referred to as a part of the heat sink 12.

Regarding the first criterion, because Woodward is solving wire routing problems by disposing some wiring 24 across the chip 16, and because Eichelberger and Jimarez have significantly different technical challenges from each other and from Woodward, the combination of Eichelberger and Jimarez with Woodward can only be reached by using the Applicant's disclosure as a guide. Withdrawal of the rejection is respectfully requested.

Regarding the second criterion, there is no expectation of success to get a better pin-out for Eichelberger by the application of Woodward, and there is no expectation of success to better ground the die in Woodward by the application of Jimarez. Withdrawal of the rejection is respectfully requested.

Regarding the third criterion, merely that the Office Action assembles a mosaic of elements to assert a rejection, does not mean all the claims limitations are taught within the standard of unobviousness. The standard of patentability requires "the subject matter as a whole" was not "obvious at the time the invention was made to a person of ordinary skill in the art . . . ." Applicant respectfully asserts that the combination of Eichelberger and Jimarez with Woodward, creates a teaching that starts to drop out claimed elements, including a patterned thermally conductive adhesive. Applicant therefore respectfully asserts this combination cannot be made without using the Applicant's disclosure as a guide. Withdrawal of the rejection is respectfully requested.

Claims 10 and 15-16 were rejected under 35 USC § 103(a) as being unpatentable over Shen (U.S. Patent No. 6,368,894) in view of Woodward et al. (U.S. Patent No. 4,731,700). The Applicant respectfully traverses the rejection and requests the Office to consider the following.



Regarding the combination of Shen and Woodward, Shen and Woodward cannot be combined because there is no location for Woodward's structure 14 between Shen's semiconductor chip 2 and second semiconductor chip 3. Therefore, the application of Woodward to Shen, destroys and renders impossible the structures taught by Shen. Any modification of Woodward's structure to be accommodated by Shen can only come by using the Applicants' disclosure as a guide because it is not found in the prior art. Withdrawal of the rejection is respectfully requested.

Regarding claim 15, the Office Action states "Woodward et al. disclose a thickness of the ceramic member 14 is greater than a thickness of at least one die 16." (Office Action at page 6). This statement reinforces Applicant's assertion that the combination of Woodward with Shen destroys the teaching of Shen. First, using Woodward's ceramic 14 with a thickness greater than the chip 16 amounts to increasing the vertical profile of Shen. This defeats the low-profile geometry of Shen. Second, Woodward's ceramic 14 is disposed upon a heat sink 12, and there is no equivalent location to place any such structure upon a heat sink in Shen. Because the motivation for such a teaching or modification comes from Applicants' disclosure, and not from the cited references, withdrawal of the rejection is respectfully requested.

Regarding claim 16, the Office Action asserts Shen discloses the package core is a material selected from the group consisting of ceramics or metals (Office Action at page 7). As set forth above, the importation of Woodward into Shen, destroys and renders impossible the structures taught by Shen. Because the combination of Woodward with Shen does not amount to the limitations of claim 16, withdrawal of the rejection is respectfully requested.

Claims 11-14 were rejected under 35 USC § 103(a) as being unpatentable over Shen (U.S. Patent No. 6,368,894) in view of Woodward et al. (U.S. Patent No. 4,731,700) and further in view of Eichelberger (U.S. Patent No. 5,250,843). The Applicant respectfully traverses the rejection and requests the Office to consider the following.

The Office Action admits "Shen and Woodward et al fail to disclose a build up layer disposed on an upper surface of the encapsulation material." (Office Action at page 7). Applicant incorporates all the arguments regarding the impropriety of combining Shen with

Woodward. Applicant further notes that the combination of Shen with Eichelberger creates the same dilemma as the combination of Shen with Woodward.

Regarding the combination of Shen and Eichelberger, Shen and Eichelberger cannot be combined because there is no location for Eichelberger's structures 18, 20, 24, and 26 between Shen's semiconductor chip 2 and second semiconductor chip 3. Therefore, the application of Eichelberger to Shen, destroys and renders impossible the structures taught by Shen, and as set forth above, Woodward also destroys the structure of Shen. Any modification of Eichelberger's structure to be accommodated by Shen can only come by using the Applicants' disclosure as a guide because it is not found in the prior art. Withdrawal of the rejection is respectfully requested.

Regarding claim 11, although the Office Action asserts Eichelberger discloses the build up layer, as set forth above the importation of Eichelberger into Shen, destroys and renders impossible the structures taught by Shen, and as set forth above, Woodward also destroys the structure of Shen. Because the combination of Eichelberger with Shen and Woodward does not amount to the limitations of claim 11, withdrawal of the rejection is respectfully requested.

Regarding claim 12, although the Office Action asserts Eichelberger discloses the build up layer and at least "on (sic) conductive trace 20" (Office Action at page 7), as set forth above the importation of Eichelberger into Shen, destroys and renders impossible the structures taught by Shen, and as set forth above, Woodward also destroys the structure of Shen. Because the combination of Eichelberger with Shen and Woodward does not amount to the limitations of claim 12, withdrawal of the rejection is respectfully requested.

Regarding claim 13, although the Office Action asserts Eichelberger further includes "at least one dielectric layer 24" (Office Action at page 7), as set forth above the importation of Eichelberger into Shen, destroys and renders impossible the structures taught by Shen, and as set forth above, Woodward also destroys the structure of Shen. Because the combination of Eichelberger with Shen and Woodward does not amount to the limitations of claim 13, withdrawal of the rejection is respectfully requested.

Regarding claim 14, although the Office Action asserts Shen discloses the encapsulation (34 and 24) covers the package core first surface, as set forth above the importation of

Eichelberger into Shen, destroys and renders impossible the structures taught by Shen, and as set forth above, Woodward also destroys the structure of Shen. Because the combination of Eichelberger with Shen and Woodward does not amount to the limitations of claim 14, withdrawal of the rejection is respectfully requested.

Claim 17 was rejected under 35 USC § 103(a) as being unpatentable over Shen (U.S. Patent No. 6,368,894) in view of Woodward et al. (U.S. Patent No. 4,731,700) and further in view of Jimarez et al. (U.S. Patent No. 6,407,334). The Applicant respectfully traverses the rejection and requests the Office to consider the following.

The Office Action admits "Shen and Woodward et al. fail to disclose a patterned thermally conductive adhesive layer." (Office Action at page 8). Applicant respectfully asserts the combination of Shen with Woodward cannot be made. The board 10 and solder ball connector 48 in Jimarez, destroys the structure of Shen. The board 10 and solder ball connector 48 in Jimarez are for mounting against a printed wiring board (Jimarez at column 3, lines 34-39), not another chip as in Shen.

Applicant incorporates all the arguments regarding the impropriety of combining Jimarez with Woodward as set forth above, and therefore respectfully requests withdrawal of the rejection.

Regarding the combination of Jimarez with Shen, Applicant notes that there is no teaching or suggestion in Shen to include a patterned adhesive, or any adhesive for that matter, between Shen's metal heat dissipating plates 23 and 33, and their respective chips 2 and 3. The combination of Shen with Jimarez can only be achieved by using Applicant's disclosure as a guide. Withdrawal of the rejection is respectfully requested.

RESPONSE UNDER 37 CFR § 1.116 – EXPEDITED PROCEDURE

Serial Number: 09/733289

Filing Date: December 8, 2000

Title: Microelectronic Package Having an Integrated Heat Sink and Build-Up Layers

Assignee: Intel Corporation

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Dkt: 884.798US1 (INTEL)

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney, John Greaves at (801) 278-9171, or the below-signed attorney to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

XIAO-CHUN MU ET AL.

By their Representatives,

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Date Oct. 20, 2003

By Ann M. McCrackin  
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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop AF, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 21 day of October 2003.

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Name

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